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Requirements and plan for a EUMETSAT Satellite Application Facility on support to Operational Hydrology and Water Management (H-SAF)

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In recent years, the interest of the hydrological community for using satellite data has rapidly increased. This is a consequence of (1) improved satellite data quality, and (2) improved performance of hydrological models including their capability to assimilate observational data. As a consequence, scientific demonstration works and operationally-oriented initiatives are proliferating. One initiative addresses EUMETSAT, aiming at extending its application ground segment by a de-centralised "Satellite Application Facility" (SAF) dedicated to the generation of satellite-derived products specifically designed as to comply with requirements for operational hydrology and water management. Intense consultation among EUMETSAT Member and Cooperating States in years 2002-2004 have led to the definition of the objectives and the scientific background for a "SAF on support to Operational Hydrology and Water Management (H-SAF)", and finally a proposal for the Development phase of H-SAF has been delivered to EUMETSAT and is now being evaluated, aiming at starting the activity in the last quarter of year 2005.

Since the early discussions, the interest for new satellite products focused on:

· precipitation rate and cumulate precipitation, including liquid/solid discrimination;
· soil moisture in the surface layer and possibly in the roots region;
· snow parameters such as effective cover, wet/dry discrimination, water equivalent.

The key element for the feasibility of generating these products with the required quality is the current or expected availability of highly-performing satellite instruments, such as: SEVIRI on Meteosat; AVHRR/3, AMSU-A and AMSU-B/MHS on MetOp and NOAA; SSM/I and SSMIS on DMSP; ASCAT on MetOp; and others, including some embarked on satellites of RD nature such as AMSR-E and MODIS on EOS-Aqua, and TMI, PR and LIS on TRMM. Instruments will be used, that will have a long-term operational future either in their current configuration or as evolutions, e.g. VIIRS, CMIS and ATMS on NPOESS to replace AVHRR/3, MODIS, SSM/I, SSMIS and AMSU. The suite of currently available instruments and processing methods will allow early start of pre-operational product generation. Progressive availability of improved instruments and processing methods will enable progressive improvement of products quality in the course of the Development phase (to last 5 years).

While progressing with the products generation activity, a hydrological validation programme will have to demonstrate the cost effectiveness of the novel data so as to support the case for a follow-on Operational phase. The ingredients of the hydrological validation programme will be:
· development of techniques to up/downscale the information for use at basin level;
· merging satellite and conventional data, and assimilation in hydrological models;
· assessment of the benefit of the new satellite data on the performance of operational hydrological models on the basis of actual experimentation on selected test sites.

Whereas the product generation activity will be performed by meteorological services supported by scientific institutes specialised in remote sensing, the hydrological validation programme will be performed by hydrometeorological services, hydrological scientific institutes and operational units of Civil Protection. The proposal submitted to EUMETSAT for the Development phase is supported by operational services and scientific institutes from 12 European Countries, with Italy serving as focal point.

The paper will mainly focus on the currently adopted user requirements and the evaluation of which products quality is potentially achievable on the basis of current and perspective satellite programmes and instrument characteristics. Progress on the status of H-SAF approval at the time of the EGU General Assembly will be provided.